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15PCD13/23

First/Second Semester B.E. Degree Examination, June/July 2023
Programming in C and Data Structures

Time: 3 hrs.   Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is variable? Explain the rules for constructing variables in C language. **(04 Marks)**
   b. Write a C program to compute simple interest. Draw the flowchart for the same. **(06 Marks)**
   c. Evaluate the following expressions:
   i) $2 * ((a \% 5) * (4 + (b - 3) / (c + 2)))$
       where $a = 8, b = 15$ and $c = 4$
   ii) $a += b *= c -= 5$
       where $a = 3, b = 5$ and $c = 8$
   iii) $100/20 <= 10 - 5 + 100 \% 10 - 20 == 5 > 1 != 20.$ **(06 Marks)**

OR

2 a. Convert the following mathematical expression into C expressions:
   i) $s = \dfrac{a+b+c}{2}$ ii) $\sin\left(\dfrac{b}{\sqrt{a^2+b^2}}\right)$ iii) $area = \sqrt{s(s-a)(s-b)(s-c)}$ **(06 Marks)**
   b. Write a C program to find the area of a rectangle. **(06 Marks)**
   c. Classify the following as valid/invalid identifiers:
   i) num2   ii) $num1   iii) +add   iv) a_2   v) sum, 1   vi) for   vii) num*
   viii) int **(04 Marks)**

Module-2

3 a. List any four differences between while loop and do-while loop along with syntax and example. **(08 Marks)**
   b. Write a C program to find the roots of quadratic equation. **(08 Marks)**

OR

4 a. Write a C program to simulate the functions of a simple calculator using switch statement. **(08 Marks)**
   b. Explain continue and break statement. **(04 Marks)**
   c. Explain the formatted I/O functions of C language with syntax and example. **(04 Marks)**

Module-3

5 a. Explain any 5 string manipulation functions along with example for each. **(10 Marks)**
   b. Write a C program to sort 'n' integers using bubble sort algorithm. **(06 Marks)**

OR

6 a. Write a C program to find the transpose of any given matrix. **(06 Marks)**
   b. What is a function? Briefly explain the parameter passing mechanism of functions. **(05 Marks)**
   c. Write a recursive program to compute factorial of a given number 'n'. **(05 Marks)**

Module-4

7 a. Write a C program to maintain a record of 'N' student details using an array of structures with four fields (Roll No, Name, Marks, Grade), each field is of an appropriate data types. Print the marks of the student given student name as input. **(10 Marks)**

   b. Explain any 3 file operations giving examples for each. **(06 Marks)**

OR

8 a. What is a file? Explain fopen( ) and fclose( ) functions. **(05 Marks)**

   b. Explain fprintf( ) and fscanf( ) functions with syntax. **(04 Marks)**

   c. What is a structure? How to declare a structure? **(07 Marks)**

Module-5

9 a. What is a pointer? Write a C program to find the sum and mean of elements in an array using pointer. **(08 Marks)**

   b. What is stack? Explain stack operations with examples. **(08 Marks)**

OR

10 a. What are primitive and non-primitive data types? Explain with examples. **(05 Marks)**

   b. Explain any 5 preprocessor directives in C. **(05 Marks)**

   c. Define Q. Explain the representation of a Q using array. **(06 Marks)**

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